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SUBMITTED TO THE U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE—MARCH 9, 2005

THE HONORABLE JOE BARTON, CHAIRMAN

Mr. Chairman and members of the Committee, my name is Nancy Colleton. I am the President of the Institute for Global Environmental Strategies and Executive Director of the Alliance for Earth Observations headquartered in Arlington, Virginia. I would like to thank the House Committee on Energy and Commerce for the opportunity to testify at this hearing.

The Institute is a non-profit, 501(c)3 organization of which the Alliance for Earth Observations is an initiative. Our efforts are devoted to furthering knowledge of the Earth system and promoting the value and use of the technology tools that help us better understand our changing planet. The Institute's efforts include everything from developing resources for K-12 science education and teacher professional development, to facilitating international cooperative activities in Earth science and applications. However, I am here today to discuss the Alliance for Earth Observations—an informal confederation of organizations—and the importance of engaging the private sector (industry, academia, and non-governmental organizations) in the planning for and implementation of the Global Earth Observing System of Systems (GEOSS). As

requested, I will address “The Implementation of GEOSS: A Review of the All-Hazards Warning System and its Benefits to Public Health, Energy, and the Environment.”

The Alliance for Earth Observations—The Public Sector Stakeholders

If GEOSS is going to truly realize social and economic benefit in the public health, energy, and the environmental sectors, then the private sector must be actively engaged in its planning. Several reasons exist for this engagement:

- the private sector provides unparalleled technical expertise to help guide the design and development of GEOSS (e.g., data creation, exploitation);
- the private sector will be a major user of the GEOSS capabilities and therefore, must have the opportunity to determine sector-specific requirements (e.g., agriculture, transportation);
- the private sector must begin its planning and preparation to ensure that their systems are consistent and personnel prepared to capitalize on the opportunities that GEOSS will provide; and
- the private sector could work in partnership with government to contribute data to GEOSS.

The Alliance for Earth Observations was established to advance the private sector’s involvement in the development, use, and integration of Earth observations and information for social and economic benefit. Just as the ad hoc Group on Earth Observations (GEO) and US Interagency Working Group on Earth Observations (IWGEO) were established to coordinate intergovernmental activities, the Alliance for

Earth Observations was established to facilitate US private sector awareness and interest in GEOSS.

Like the Earth observation community itself, the Alliance membership is diverse and includes stakeholders such as system developers, data providers, geospatial technology firms, university-based research institutes, and a non-governmental organization that focuses on science applications for the conservation community. In addition to membership, the Alliance aggressively works to establish strategic partnerships with numerous organizations that will enable us to reach the potential GEOSS beneficiaries. Since our effort began in December 2003, we have engaged a wide range of groups including public health professionals to reinsurance, energy, transportation, and agricultural industry representatives. A listing of Alliance Members is included in *Attachment B*.

As a result of our efforts to reach out to the broad private sector community, the Alliance has been able to contribute to the national planning for GEOSS. For example, 40 representatives from 23 organizations participated in the Industry Workshop on GEOSS Architecture, held May 20, 2004. The workshop was conducted in cooperation with the Industry Advisory Council. The results, lessons learned and recommendations of this independent analysis were presented to the IWGEO.

Another major Alliance contribution was bringing together government and private sector leaders at the Forum on Earth Observations. Held in September 2004, the Alliance—in

partnership with the National Oceanic and Atmospheric Administration—hosted the Forum and brought together 200 business, academic, and non-government organization executives with senior government executives to communicate plans for GEOSS. In addition, participants explored how Earth observations are currently being used in the energy, agriculture, public health and transportation sectors. The importance of US leadership in global Earth observations initiatives, the need to examine new, public-private partnerships, and the importance of the human architecture to support GEOSS were identified and discussed at the Forum.

Important parts of the business case supporting the needs for observations have already emerged. In the paper “Critical Use of Environmental Information in Industry Operational Decisions Aids and Scenario Building,” Mary G. Altalo, Corporate Vice President, Science Applications International Corporation (SAIC), an Alliance member, states:

For the U.S. economy, of the estimated \$2.2 trillion revenue impacted annually as a result of adverse or severe weather events, the hotel and recreation sector’s share was estimated at \$147B, another \$125B for agriculture, forestry, fishing; \$89B in energy resource extraction; \$2.7B in public utilities; \$260B in finance and insurance; \$373B in construction; \$728B retail trade; and \$218B in transportation (Dutton 2001). Thus, any advanced information that would mitigate the impact of these disasters is of highest priority for the industries.

Therefore, it is easy to understand why weather information, which is just one part of GEOSS, should be of such interest to the private sector. GEOSS could provide better information from a variety of sources to affect decision making in all sectors, including preparedness and response to natural disasters, which must include robust, all-hazard warning systems.

Implementation of GEOSS and the All-Hazards Warning System

You are well aware that in addition to integrating the world's surface, airborne and space-based Earth-observing instruments, the GEOSS effort will attempt to fill in large gaps between data points (blind spots). GEOSS will also facilitate development of new data processing and visualization tools, establish protocols for the sharing of data among countries, and improve the way environmental information is communicated in times of crisis. Potential benefits include improved forecasts of tsunamis, hurricanes and other natural disasters, and better management of agriculture, forests, energy and water resources, and public health.

In addressing GEOSS implementation and the All-Hazards Warning System, one of the key questions that needs to be asked is: Why should an organization such as the US Government invest its time, effort, or funds to collaborate with external organizations?

From an efficiency viewpoint the answer is "leverage"; from an effectiveness viewpoint, the answer is "synergy."

For example, to update its land use plans, a city needs current demographic data, transportation data, land ownership data, and many other kinds of data. Yet, much of this data is also needed by agencies at the County, State, and Federal levels. When these kinds of data are shared using common standards, each sharing agency leverages the investment made by any of the others. And, they typically have synergy as well, because the ability to correlate different sets of data increases the value of each set.

Earth observation data is needed not only for government agencies, but for companies evaluating prospective sites, farmers monitoring their crops, emergency managers dealing with threat situations, citizen groups engaged in public policy discussions, or parents checking the daily weather. Already, these users can take advantage of relevant data from satellite remote sensing, aerial surveys, ground-based monitoring systems, and a wealth of socio-economic data. But, the Earth observation data being exploited today is a fraction of what could be available from existing systems, from observing systems soon to be operational, and from observing systems now in the early planning stages.

U.S. Federal agencies involved in Earth observations have a long tradition of sharing scientific data. Most are already deeply involved in building the U.S. National Spatial Data Infrastructure, which goes a long way toward realizing the vision of shared data based on agreed standards. The agencies are building on this base but need to go even further in leveraging investments and realizing synergy across systems and governments. They need to exploit collaborative opportunities early in the design of new systems. They need to get deeper agreements on data standards, so that different sets of data can be

more easily integrated to yield synergistic products that support a broader class of decision-makers.

Across national boundaries, the sharing of Earth observations data has a long record of success in the case of weather data. GEOSS broadens this tradition of sharing. In doing so, it leverages investments in many other multi-national observing systems and gains synergy across other societal benefit areas such as disaster reduction. A case in point concerns the disaster that occurred in December 2004.

On December 26, an undersea earthquake was reported by the Global Seismographic Network, one of the systems participating in GEOSS. When such an event occurs, warning centers should be ready to send an early warning to pre-designated authorities in nations that might be affected. As called for in the GEOSS plan, those nations would have prepared hazard maps showing vulnerable areas and evacuation routes, based on high-resolution maps.

Emergency management authorities interpret incoming alerts in their local context. They might decide to trigger an integrated public warning system to activate various communications media. The system converts an alert message automatically into forms suitable for available communication technologies. These might include voice on radio and telephones, text captions on television, messages on highway signs, or signals for sirens. This all-media, all-hazard public warning technology is consistent with the

GEOSS architecture that encourages system interfaces using international standards such as the Common Alerting Protocol (CAP).

I want to mention that the Alliance for Earth Observations endorses the "Challenge of Public Warning," as expressed by the Internet Society. This call for collaborative action seeks to assure that societies worldwide can implement standards-based, all-media, all-hazards public warning. We are joined in this by leading government agencies such as the National Weather Service, the U.S. Geological Survey, and the National Association of State Chief Information Officers. The challenge is endorsed as well by advocacy groups such as the Partnership for Public Warning, and key international organizations such as the UN International Strategy for Disaster Reduction, and the International Telecommunications Union. We are also joined in this call to action by other visionary groups representing the private sector, including the Emergency Interoperability Consortium, the AMBER Alert Consortium, and the ComCARE Alliance.

GEOSS should address all-hazards warning systems as a priority as ultimately—whether a tsunami, hurricane, or wildfire—the decision-making information resulting from GEOSS must also be broadcast as urgently and broadly as possible through various communication media, all of which must be compatible with GEOSS. The private sector must be engaged in this endeavor.

Involvement of the private sector is crucial to meeting the challenge of public warning. Involvement of the private sector is also crucial to the success of GEOSS. As stated

earlier, last year, the Alliance for Earth Observations joined with the Industry Advisory Council to evaluate the proposed architecture of GEOSS. We concluded that the proposed GEOSS architecture is well aligned with current industry practice, and with trends in systems architecture. However, we need to assure that interaction with the private sector occurs on a regular basis. The Alliance for Earth Observations is eager to help formalize such interaction.

Benefits to Public Health, Energy, and Environment

The Vision Statement presented in the *Strategic Plan for the U.S. Integrated Earth Observation System* states “Enable a healthy public, economy, and planet through an integrated, comprehensive, and sustained Earth observation system.” The topics of public health, energy, and environment are recognized as priority areas within the plan. And the IWGEO should be applauded for the extensive work that it has conducted over the last 18 months. However, as we begin to examine the GEOSS benefits to public health, energy, and environment, it must be recognized that our existing systems were originally conceived and developed by and for the science community are the same systems that are intended to support operational efforts for economic benefit. This is not to say that GEOSS should not be based on sound scientific data and information, because it should. It is to say that providing operational information products to benefit the public health, energy, and environmental communities are different than providing raw data to a research scientist and emphasize the critical link in creating information products for these different sectors. It also reinforces the importance of conducting sector-specific

user requirement studies as a broad consensus of the data products required by these sectors does not exist.

We can, however, examine current efforts that provide the rationale for new information systems to support these sectors. The article, “The Business Case for the Global Observing System” published in April 2003 in *Oceanography*, discusses the relationship between climate and weather and the energy industry. According to the article, climate and weather have a direct and extensive impact on:

- Oil and gas exploration, development and production operations (accurate surveying and precise drilling)
- Refining and Transport Operations (planning natural gas supply and delivery strategies)
- Renewable Energy Operations (forecasting environmental impacts on hydropower)
- Electricity Generation, Transmission, and Distribution (Energy pricing /financing markets)
- Global Management (Destabilization of economies by weather, climate, and ocean hazards)

In regard to environmental benefits, at last week’s Western Governor’s Association meeting, Montana Governor Brian Schweitzer remarked that he and his fellow governors need better environmental information. In this particular case, he referred to the seven-year drought that Montana is experiencing and the critical need for an integrated drought information system. This drought system would be part of GEOSS and support the challenging decisions these governors face in dealing with drought—a quiet, but highly

volatile natural hazard. As Governor Schweitzer described it, “Our forests could explode.” Therefore, any decision support system that would contribute to the planning for and responding to wildfires, deploying an already over-subscribed National Guard, or coordinating tanker resources would be highly beneficial for Governor Schweitzer and others.

One of the most promising and exciting areas that could benefit from improved observations and data analysis is the area of public health. Observation information is already being applied to determine the connection between our environment and skin cancer, asthma, West Nile Virus, and malaria to name a few. In *Environmental Health Indicators: Bridging the Chasm of Public Health and the Environment* (National Academies Press, 2004), it states that environmental health professionals recommend more research of the environment to many other disease incidences. “This is a growing concern because, in the United States alone, chronic disease contributes to more than half of all deaths and illnesses at an annual cost of \$325 billion. The role of the environment in disease is further questioned because of increase in the number of reported clusters for cancer, Parkinson’s disease, multiple sclerosis, and Alzheimer’s disease.” We all know someone who has suffered and died from one of these debilitating diseases. And, there may not be a connection between the environment and these diseases. However, studies such as this one provide a unique insight on the great potential for making new discoveries or ruling out theories by providing a technological solution to integrate different types of data to determine if a link in fact exists. The potential value that could

be derived from further application and integration of environmental and health data alone should urge us to embark on establishing GEOSS as soon as possible.

To capitalize on potential benefits, The Alliance for Earth Observations urges that a Federally-sponsored private sector Advisory Council be established to capitalize on this opportunity. Membership in the Council should include industry, academic, and non-governmental experts representing the many business sectors that will benefit from GEOSS. These sectors could include public health, energy, environment, agriculture, finance and reinsurance, transportation, and technology sectors. The Alliance would be pleased to assist in the development of this Council.

Summary

Although international political backing, especially that of the White House, has been critical to getting this project off the ground, the time has come to make the private sector -- industry, academia and non-governmental organizations -- an active partner in the design, development and implementation of GEOSS. To realize the full potential of Earth observations for social and economic benefit, the private sector must be an active partner in developing future observation and warning systems. There are certain and important technological solutions for which businesses, colleges and universities, and non-governmental organizations are best suited to provide.

Indeed, history has shown that government, in partnership with the private sector, can achieve so much more than it can on its own. It was the government that launched the first communications and weather satellites. But it has been the private sector that, since

then, has played a critical role in developing the technology and value-added services that have sparked today's multibillion-dollar telecommunications and geospatial industries. A similar model based on public and private cooperation should be followed as the world's first global observation system takes shape.

Aerospace, telecommunications and information technology are just a few of the industries that should play an integral role in the early stages of this effort. The nation should harness the private sector's best and brightest—the same people who have built the tools and technologies that now enable us to receive weather reports and monitor the stock market via mobile phones—and engage them in new solutions to collect, compile, integrate and distribute key Earth-related information.

Were it not for the hard work of governments worldwide, we would not be where we are today—on the cusp of a new era in Earth observations. The time has come, however, for the United States to forge new partnerships with the private sector and reach new heights in the monitoring and management of our planet. We believe the GEOSS can demonstrate its early value by creating a robust all-hazards warning system. However, a greater value of GEOSS, which has potential to impact trillions of dollars in products and services, will only be realized if the private sector works in close partnership with government.

Summary of Key Points

The Alliance for Earth Observations—an informal confederation of private sector organizations—has as its mission to advance the private sector’s involvement in the development, use and integration of Earth observations and information for social and economic benefit.

The Alliance recommends that the private sector (industry, academia, and non-governmental organizations) be actively engaged in the development of the Global Earth Observing System of Systems (GEOSS).

GEOSS should address All-Hazards Warning Systems as a near-term priority and enlist the participation of the private sector to identify innovative solutions that might include voice on radio and telephones, text captions on television, messages on highway signs, or signals and sirens. This all-media, all-hazard public warning technology is consistent with GEOSS architecture and encourages system interfaces using international standards such as the Common Alerting Protocol (CAP).

GEOSS benefits to the public health, energy, and environmental sectors will only be realized if these sectors are engaged in GEOSS planning and implementation.

Although studies have been conducted to show the rationale and impact of observations on various business sectors such as public health, energy, and the environment, user requirements studies should be conducted to determine specific needs of the various sectors that will benefit from GEOSS.

The United States should establish a private sector advisory council to ensure that the interests and requirements of non-Federal entities are considered in GEOSS planning and implementation.

Attachment B

Alliance for Earth Observations Membership

Ball Aerospace & Technologies Corporation

Boeing

Center for International Earth Science Information Network (CIESIN) at Columbia University

ESRI

ITT Space Systems Division

Lockheed Martin

NatureServe

Northrop Grumman

Raytheon

Science Applications International Corporation (SAIC)

Scripps Institution of Oceanography